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(54) Display including a plurality of display panels

(57) A display allowing further miniaturization when including a plurality of display panels is obtained. This display comprises a first display panel (1,51,81,161, 202,252,302,362,372) formed on a substrate (11,61,91, 121,201,251,301,351,361,371) and a second display panel (2,52,82,162,203,253,303,363,373) formed on

the same substrate (11,61,91,121,201,251,301,351, 361,371) on a region different from that formed with the first display panel. Thus, the display can be further miniaturized as compared with that having a first display panel and a second display panel formed on different substrates.

FIG.2

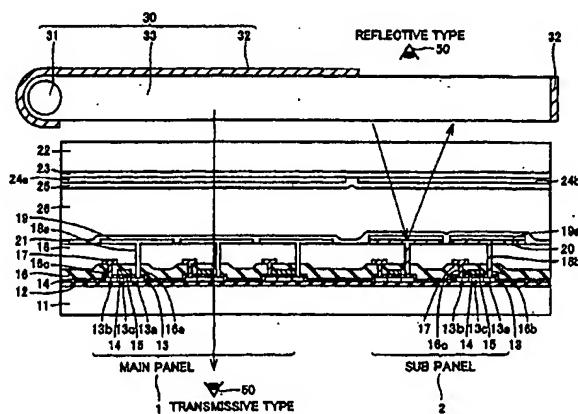
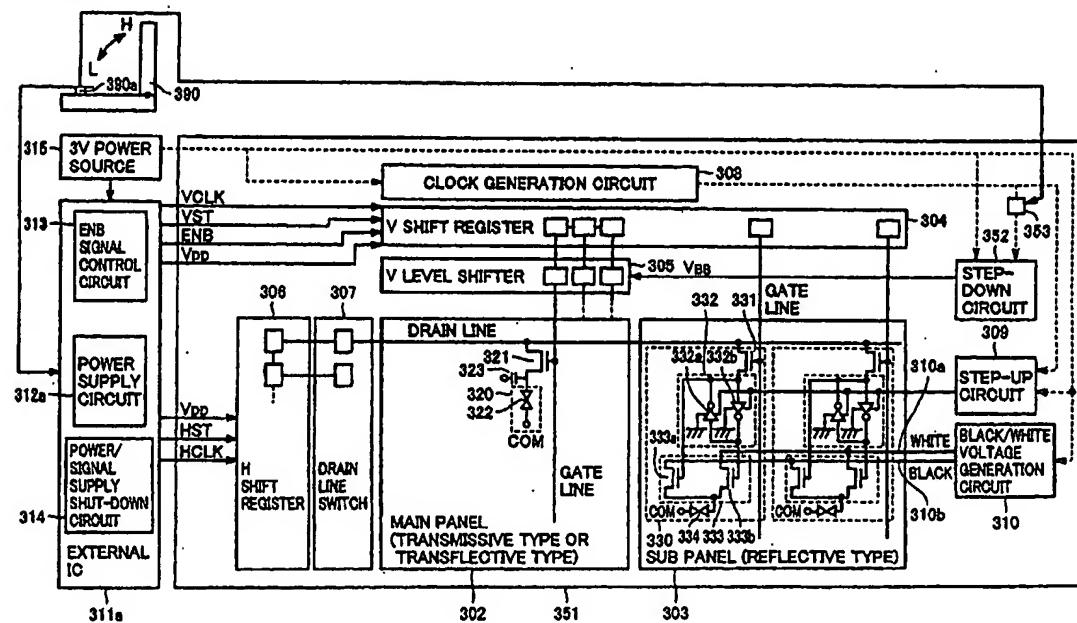


FIG.19





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)
X	US 2001/023194 A1 (HEDED ERIK ET AL) 20 September 2001 (2001-09-20)	1-4,6-8, 11	G09G3/36 G02F1/1333
Y	* abstract; figure 4 *	5,9,10, 23-27,29	G02F1/1335 G02F1/1362 H04M1/02
Y	* paragraph [0022] - paragraph [0032]; claims 1-8 *	-----	
Y	US 2001/020991 A1 (BAN ATSUSHI ET AL) 13 September 2001 (2001-09-13) * figures 2,19 *	5,9,10	
X	WO 00/36578 A (QUALCOMM INC) 22 June 2000 (2000-06-22)	1-4,6-8, 11	
Y	* abstract *	5,23-27, 29	
A	* figure 4 *	9,10	
X	EP 0 881 617 A (NOKIA MOBILE PHONES LTD) 2 December 1998 (1998-12-02)	1-4,6-8, 11	
Y	* abstract *	5,23-27, 29	
A	* figure 3 *	9,10	
Y	US 5 764 324 A (LU MINHUA ET AL) 9 June 1998 (1998-06-09) * figure 3 *	5,9,10	
X	US 6 005 645 A (KOYAMA JUN ET AL) 21 December 1999 (1999-12-21)	1,12-14, 16-23, 25,29, 30,32, 34-36	
Y	* abstract; figures 2,10,14 *	15	
Y	US 5 767 924 A (KONUMA TOSHIMITSU ET AL) 16 June 1998 (1998-06-16) * figure 20 *	15	
		-/-	
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
Munich	28 April 2004	Wolfrum, G	
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone	T : theory or principle underlying the invention		
Y : particularly relevant if combined with another document of the same category	E : earlier patent document, but published on, or after the filing date		
A : technological background	D : document cited in the application		
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EUROPEAN SEARCH REPORT

Application Number

EP 03 25 4918

DOCUMENTS CONSIDERED TO BE RELEVANT																		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)															
Y	EP 1 204 089 A (SANYO ELECTRIC CO) 8 May 2002 (2002-05-08) * abstract; figures 1,2,5-8 * * paragraphs [0012], [0038] - [0053] *	23-27, 29,34																
X	EP 1 146 502 A (SANYO ELECTRIC CO) 17 October 2001 (2001-10-17)	1,30-32, 35,36																
Y	* abstract; figures 1-6,9-15 * * paragraphs [0054] - [0062], [0090] - [0097] *	34																

			TECHNICAL FIELDS SEARCHED (Int.Cl.7)															
<p>The present search report has been drawn up for all claims</p> <table border="1"> <tr> <td>Place of search</td> <td>Date of completion of the search</td> <td>Examiner</td> </tr> <tr> <td>Munich</td> <td>28 April 2004</td> <td>Wolfrum, G</td> </tr> <tr> <td colspan="3">CATEGORY OF CITED DOCUMENTS</td> </tr> <tr> <td colspan="3"> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document </td> </tr> <tr> <td colspan="3"> T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons B : member of the same patent family, corresponding document </td> </tr> </table>				Place of search	Date of completion of the search	Examiner	Munich	28 April 2004	Wolfrum, G	CATEGORY OF CITED DOCUMENTS			X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons B : member of the same patent family, corresponding document		
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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11

A display comprising a first display panel formed on a substrate and a second display panel formed on the same said substrate in a region different from the region formed with said first display panel wherein the reflecting electrode constitutes the pixel electrode.

2. claims: 1, 12-22

A display comprising a first display panel formed on a substrate and a second display panel formed on the same said substrate in a region different from the region formed with said first display panel wherein the display comprises a first shift register driving the gate lines and a second shift register driving the drain lines of the two display panels and an output shutdown circuit shutting down an output from said first shift register.

3. claims: 1, 23-29

A display comprising a first display panel formed on a substrate and a second display panel formed on the same said substrate in a region different from the region formed with said first display panel wherein the display comprises a static memory built in said second display panel for holding a signal from said drain line in response to a signal input from the gate line and a signal selection circuit selecting a digital video signal, and a power/signal supply shutdown circuit for shutting down supply of power and a driving signal to signal line driving circuits, and a level shifter for converting the voltage level of a signal supplied to a gate line of the first display panel, and a negative voltage generation circuit formed on the substrate for generating a negative voltage supplied to the level shifter, and a negative voltage supply shutdown circuit for shutting down supply of the negative voltage from said negative voltage generation circuit to said level shifter when the static memory of the second display panel holds the signal.

4. claims: 1, 30-36

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LACK OF UNITY OF INVENTION
SHEET B

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

A display comprising a first display panel formed on a substrate and a second display panel formed on the same said substrate in a region different from the region formed with said first display panel wherein a signal is scanned at a first scanning frequency on said first display panel, and a signal is scanned at a second scanning frequency smaller than the first scanning frequency on the second display panel, and the first display panel includes a first storage capacitor, and each pixel of the second display panel includes a second storage capacitor having a larger capacitance value than the first storage capacitor.

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ANNEX TO THE EUROPEAN SEARCH REPORT
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28-04-2004

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2001023194	A1	20-09-2001	AU 3962401 A		03-10-2001
			SE 0000906 A		21-09-2001
			WO 0172014 A1		27-09-2001

US 2001020991	A1	13-09-2001	JP 3281849 B2		13-05-2002
			JP 11109417 A		23-04-1999
			JP 3284187 B2		20-05-2002
			JP 11281972 A		15-10-1999
			CN 1209565 A		03-03-1999
			JP 2955277 B2		04-10-1999
			JP 11101992 A		13-04-1999
			TW 509809 B		11-11-2002
			US 6195140 B1		27-02-2001
			US 6330047 B1		11-12-2001
			JP 2000019563 A		21-01-2000
			US 6295109 B1		25-09-2001
			US 2001055082 A1		27-12-2001

WO 0036578	A	22-06-2000	AU 2480600 A		03-07-2000
			WO 0036578 A1		22-06-2000

EP 0881617	A	02-12-1998	FI 972213 A		27-11-1998
			AT 214507 T		15-03-2002
			CN 1200526 A		02-12-1998
			DE 69804156 D1		18-04-2002
			DE 69804156 T2		31-10-2002
			EP 0881617 A1		02-12-1998
			JP 11007259 A		12-01-1999
			US 6583770 B1		24-06-2003
			US 2003189528 A1		09-10-2003

US 5764324	A	09-06-1998	JP 3201990 B2		27-08-2001
			JP 10206845 A		07-08-1998
			KR 271201 B1		01-11-2000

US 6005645	A	21-12-1999	JP 9080387 A		28-03-1997

US 5767924	A	16-06-1998	JP 8338974 A		24-12-1996
			JP 8338975 A		24-12-1996
			JP 9005774 A		10-01-1997
			JP 9005698 A		10-01-1997

EP 1204089	A	08-05-2002	CN 1369872 A		18-09-2002
			EP 1204089 A1		08-05-2002
			JP 2002207442 A		26-07-2002
			TW 529001 B		21-04-2003

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 03 25 4918

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-04-2004

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 1204089	A		US	2002057266 A1		16-05-2002
EP 1146502	A	17-10-2001	JP	2001356746 A		26-12-2001
			JP	2002297105 A		11-10-2002
			JP	2002297106 A		11-10-2002
			CN	1317779 A		17-10-2001
			EP	1146502 A2		17-10-2001
			TW	521247 B		21-02-2003
			US	2001052887 A1		20-12-2001